Water Supply and Sanitation Challenges in an Urban Setting: A Case Study

David O. Olukanni, Michael O. Ajetomobi, Samson O. Tebowei, Olakunle O. Ologun, Oluwasanmi M. Kayode

***Abstract*— Access to clean water, good sanitation services and improved hygiene practices enhance sound health, boost socio-cultural development, and promote economic balance. This study is focused on investigating and identifying the state of water, sanitation and hygiene practices in an urban setting, and proffer solutions to the probable challenges associated with it. Five Local Government areas (LGAs) of Lagos State were selected for this study. The survey involved the use of structured questionnaires administered to randomly selected residents from the LGAs. The Statistical Package for Social Sciences (SPSS) software application and descriptive statistics were used for data analysis. The study reveals that access to water and proper sanitation is insufficient and its services is at high cost to many of the residents who live below the poverty line of less than $2 per day. The supply of water from the water corporation to the local government is not sufficient thereby making many to rely on commercial and private boreholes which often time is expensive. The result also shows that indifferent attitude characterizes poor sanitation which is basically associated with poor maintenance, indiscriminate dumping of refuse in drains and ineffective drainage systems. It is therefore important that sustained cooperation be developed among key actors in order to reduce cost of gaining access to potable water. There should also be continuous sensitization and enlightenment campaigns to the public on the dangers of environmental neglect.**

***Index Terms*— Hygiene, Local Governments, Lagos State, Sanitation, Urban Setting, Water Supply.**

I. INTRODUCTION

The provision of potable water supply and good sanitation services at a reasonable and affordable cost is the first step in eliminating poverty. These have been established to improve health, boost socio-cultural development, and promote economic balance (Okun, 1988; Bendahmane 1993; Olukanni, 2013; Olukanni et al., 2014a). More so, it is known to be the basic primary drivers of public health, personal hygiene and human dignity (WHO/UNICEF, 2000). The Millennium Development Goal (MDG) target for water and sanitation provides a useful framework to monitor global, regional and national progress in extending access to safe water and sanitation (WHO/UNICEF, 2012). Using data collected by national statistics offices and other relevant institutions through household surveys and censuses, the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP) estimates progress alongside the MDG target (UNESCO 2009; WHO/UNICEF, 2012). Over 600 surveys and censuses were used, including the USAID Demographic and Health Surveys (DHS) and the UNICEF Multiple Indicator Cluster Surveys (MICS) (Cairncross et al., 2006).

Globally, it has been observed that poor sanitation has been a major challenge to development, education, gender equality, social-economic development and progress on health in many developing countries (UNICEF/WHO 2012). In the African Continents, the issue of water and sanitation has not been any different. In the year 2000, it was noted that one-sixth (1.1 billion people) of the population in Asia and Africa did not have access to improved and treated water supply, and two fifth (2.4 billion people) did not have access to improved sanitation. Africa is known to have the lowest water supply coverage of the global regions (Africa, Asia Latin America and the Caribbean, Oceania, Europe, and North America) and is second to Asia in terms of lowest sanitation coverage (UNESCO, 2009; UNICEF/WHO, 2012).

In Africa, 2% of the total population have access to improved water supply and 60% have access to improved sanitation, but the situation in the rural area is worse with only 47% of their population having access to improved supply and 45% having access to improved sanitation (WHO/UNICEF, 2000). According to the report by UNICEF/WHO (2012), coverage rate in 2010 was lower than the rate in 1990 and below 10% of the 2010 rate required to meet the target in the sub Saharan Africa. In 2010, an estimate of 66 million Nigerians were without access to an improved drinking water source. This makes Nigeria one of the ten countries in the world with the largest population without access to an improved drinking water source. This is as a result of increase in population which is not directly proportional to the facilities provided for water supply and sanitation compared to those in India and China.

As the MDG target year is closer, it is unimaginable that less than 50 percent coverage in potable water supply and access to basic sanitation are still evident in sub-Saharan Africa with no exception to Nigeria. In Nigeria, access to clean water and proper sanitation is a major challenge. Water and sanitation

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coverage rates in Nigeria are amongst the lowest in the world (WSMP NIGERIA, 2008). According to a report by the WSMP (2008), Nigeria is currently not on track to reach the MDG targets of 75% coverage for improved drinking water and 63% coverage for improved sanitation by the year 2015. Also, the proportion of the urban population with access to improved sources of drinking water in Nigeria decreased by 15% from 80% in 1990 to 65% in 2006. The reduction by 15% in 16 years is very important at a time that the proportion of the population living in urban areas increased from 30% in 1990 to 49% in 2006. The sanitation sector has not been doing well also, because the number of people with access to improved sanitation services in urban areas in 1990 was 6 million out of 26 million people in urban areas. In 2006, 24 million out of 69 million people residing in urban areas had access to improved sanitation services (Sari and Ari, 2006; WSMP NIGERIA, 2008). Sanitation in Nigeria is also following a negative trend, which has led to slow progress in the aspect of proper sanitation. Figure 1 shows a regression line of the current status of water and sanitation in Nigeria. It implies that Nigeria is not on track with the MDG target on safe water and basic sanitation.

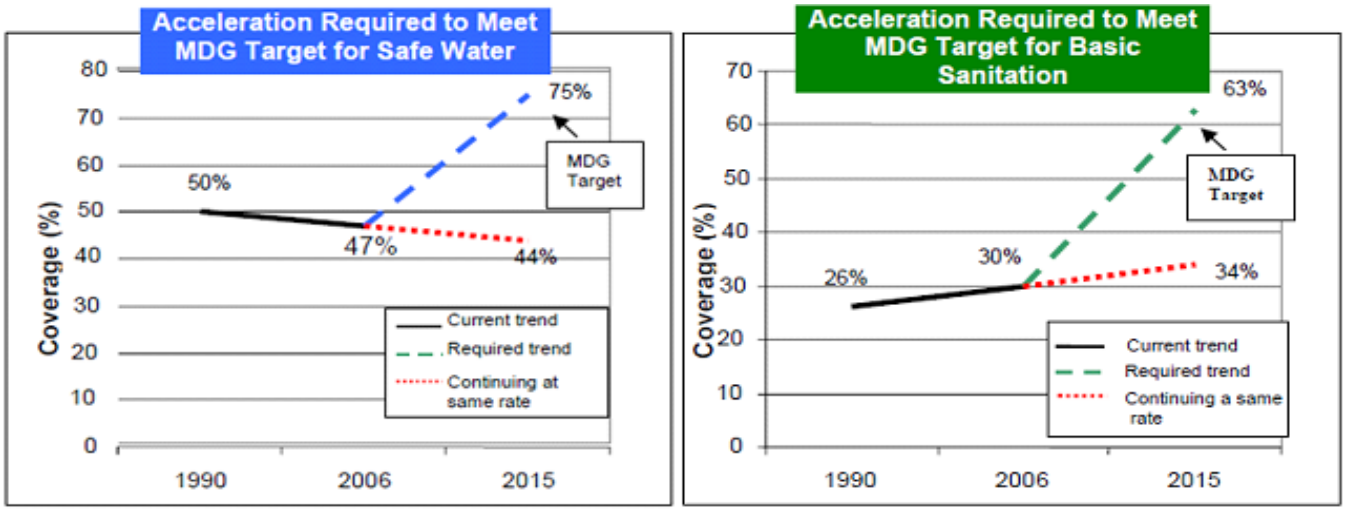

Fig. 1 Current Status of Water and Sanitation in Nigeria
Source: JMP 2008

Generally in Lagos State, a highly dense populated state, the challenge with water supply and sanitation are prominent issues that are yet to be completely solved by the government. Lagos State being the social and commercial hub of the nation with increasing population of over 20 million (making it about 12 percent of Nigeria's population) is the focus of this study. Most residents of the State have problems accessing potable water and proper sanitation due to the high cost that has been placed on them by the government or private scheme. Therefore, the aim of this study is to determine the service levels, cost of water and sanitation in the State.

Fig. 2 Map of Lagos State showing the Selected Locations

II. METHODOLOGY

The Study Area

Lagos State lies between the sedimentary belt of South-Western Nigeria on longitude 2o 45'E and 4o 20'E and latitude 6o 2' N and 6o 4' N. It is the most urbanized State and its cities are ranked amongst the major growing cities in Nigeria (Mabogunje, 2002). It has a land area of 3577.28km2 and population density of 4906.78 persons per km2 (Source: Surveyor-General Office Secretariat, Ikeja) and has a population of about 17,552,942 (Census, 2006). Fig. 2 shows the map of the study area with the selected locations.

Five (5) Local Government Areas (LGAs) in the State were selected. These are Mushin, Alimosho, Ikeja, Agege, and Ifako-Ijaye which are closely linked together as shown in Figure 2 of the State Map. This serves as a reflection of the happenings in other LGAs. Data collection was carried out in five (5) weeks in the months of February through March, 2014 with the use of questionnaires and interview. A well-structured questionnaire was distributed to 250 persons spread across the selected five (5) Local Government areas. The descriptive cross-sectional study identified 50 respondents from each location through careful selection. Interviews with the residents, observation and focus group

discussions were also adopted in capturing data and information. The questionnaire covers personal data, water quality, water availability, faecal disposal and hygiene promotion in the immediate environment. The questionnaires were structured to respect the rights and anonymity of the respondents. Confidentiality was regarded in all phases of study and all published data were in accordance with permissions granted by respondents. The data collected was analyzed using IBM SPSS Statistics 22 to get the total percentage for each location and Microsoft Excel was used to make a comparison of the LGAs.

III. RESULT AND DISCUSSION

Analysis on Service levels and Cost of Water

Private and commercial borehole is the most accessible to the communities. There is a constant supply of water from these sources because residents can make use of their generators to pump water when there is no power supply. They can also maintain the borehole personally if they have any problems with it. Fig. 3 shows the comparison of the sources of water in the selected locations of the State.

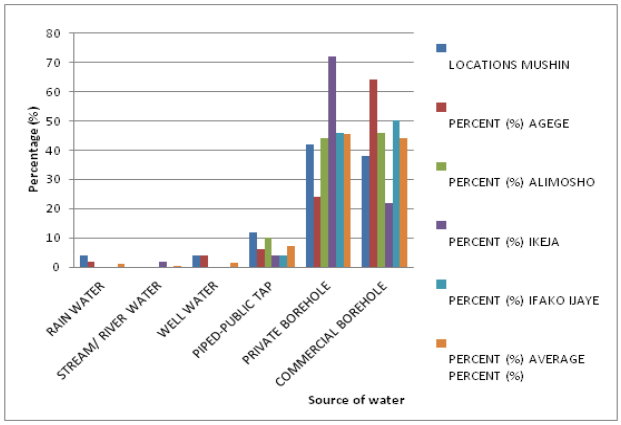

Fig. 3 Response on Source of Water

There are a few boreholes which supply free water. However, the people complained of lack of power supply to pump water into the overhead tanks therefore rendering the source ineffective when there is no power supply. Maintenance is also an issue facing the available boreholes supplying free water. The residents of Ikeja are the major users of private borehole while the residents of Agege are the highest users of commercial borehole. Majority of the residents use the water from the boreholes mostly for washing while they source for packaged water popularly referred to as pure water for drinking. This is an indication that most of the commercial water sources are not potable for drinking purpose.

The supply of water from the water corporation to the LGAs is not sufficient thereby making many to rely on commercial and private boreholes which often time is expensive, bearing in mind that majority of the people live on earnings that is less than N25,000 ($145) in a month. Based on interviews, observation and group discussions, people buy water from their neighbors that have boreholes and from men that use Jeri-cans in a cart to sell water. On the average, people in selected location buy water 3 times a week and 12 times a month which cost about N200 (less than $2) to buy a cart of non potable water that last for 2 days, $24 in a month and $288 in a year. This could be termed very expensive, if this amount of spending is on water that would be used for only domestic uses. A significant percentage of the populations still have to buy the popularly called “pure water” for drinking because the borehole water in most instances is not potable. Other issues related to water supply include lack of maintenance of water facility and lack of adequate electricity for pumping water into overhead tanks. 67 percent of the surveyed LGAs’ population sees the cost of getting water as expensive while 33 percent of the respondents find it affordable. Fig. 4 shows the estimated income of the population.

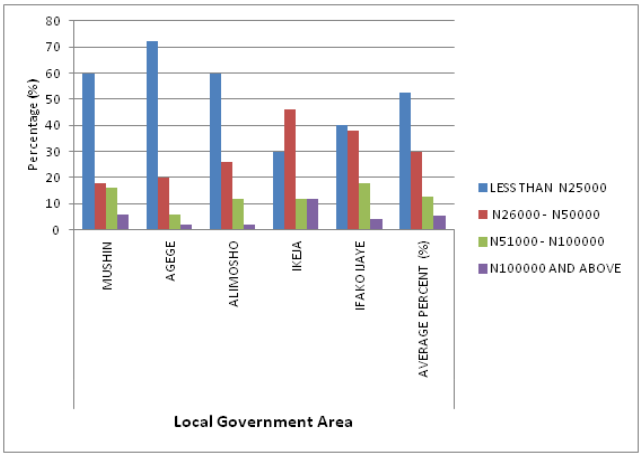

Fig. 4 Average Estimated Income of the Respondents

Based on spot checks and observation, people buy water from their neighbors that have boreholes or from the water being sold by men using jerry-cans in a cart. Fig. 5 shows the cart used in selling water and source where some of the cart pushers get this water from.

Fig. 5 Cart used in selling water and the source

If the issue of power supply can be resolved in these areas, source of water would be very cheap and easy for residents to access. Most of the individuals who own these boreholes get to use their generator to pump water and when selling the water, they would have to add extra cost because of the fuel or diesel used. Figs. 6 and 7 show the most needed facility and a set of people queuing for commercial water in one of the locations, respectively. These people would consume their

water between two days therefore they would have to buy water 3 times a week and 12 times a month which is expensive on the long run.

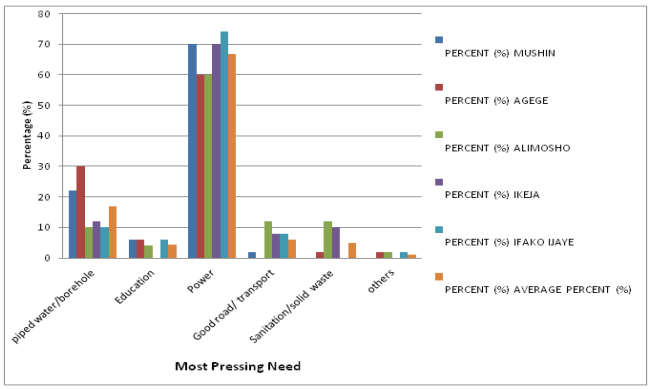

Fig. 6 Comparison of Most Pressing Need in the 5 LGAs

Fig. 7 Residents queuing for a Piped-Public Source

The majority of the population that drinks the borehole water does not have money to treat it while those who manage to treat the water do so through boiling. Very few persons use "water guard" for treating their water because they feel it is not a necessity. Other persons prefer to buy pure water for drinking rather than drink the borehole water because the borehole water is not potable.

Sanitation Related

In spite of the provision of waste collection vehicles by the government and the private service providers, there is still indiscriminate dumping of waste on the road side which later gets into the drainage. The result of the investigation shows that indifferent attitude characterizes poor sanitation which are basically associated with poor maintenance, indiscriminate dumping of refuse in drains, erection of building on drainage channels and alignments that inhibit the flow of water. All these lead to bad odor, blockage of drains and breeding of mosquitoes and other critical environmental hazards. There is need for drainage covers so as to prevent persons from dumping waste into the water ways which causes blockage and breeding of mosquitoes in the environment. A continuous sensitization and enlightenment campaign is also needful to let the public be aware

of the dangers of environmental neglect. Also, adequate provision should be made for waste bins in the environment so as to allow people dispose their waste materials properly. Fig. 8 shows indiscriminate dumping of refuse in the drainage path.

Fig. 8 Indiscriminate dumping of waste in drainage

It was revealed during interviews that over eighty percent of the residents make use of the Government Disposal plan for disposing waste on a weekly basis. Due to ignorance and illiteracy of most persons in the semi-urban areas they tend to throw their wastes into the drainaige facility which in turn makes a breeding ground for diseases and also causes flooding of the environment during the raining seasons. The Lagos State government has really made efforts in the aspect of keeping the State clean and free of wastes. The disposal techniques are yet to be perfected compared to the developed countries. Figure 9 above shows the responses of the residents on the intervention of the government. The survey revealed that government efforts are not consistent in these areas.

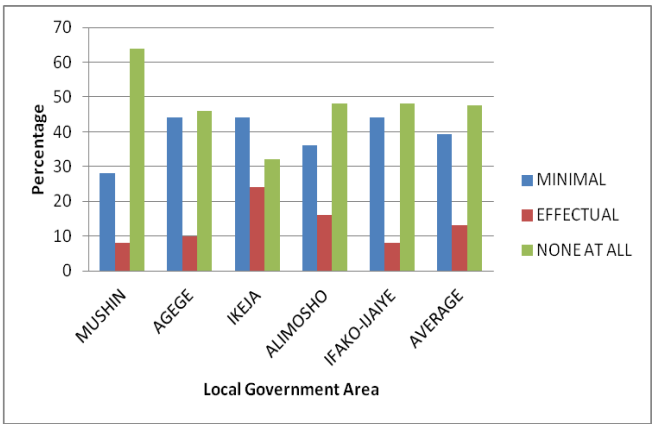

Fig. 9 Government interventions in each LGA

Hygiene Issues

Most hygiene practices are taught in homes within the family members and others are taught in schools, hospitals, health centers e.t.c. Generally, everyone is aware of what hygiene practices means. Washing of hands with soap after defecation is a proper hygiene practice, washing of hands before eating and before cooking are also proper hygiene practices. Result from the survey shows that people take proper hygiene very serious in the survey, while just a few persons are still lacking behind. Taking of bath more than once daily is a good hygiene practice. As a result of availablity of water, most persons in all five locations take their bath more than once in a day while the remamining few do not as a result of lack of water or lack of funds to get the required quantity of water needed for a proper hygiene

practice. Majority of the population make use of the Modern flush toilet system. This facility is available because majority of the population live in rented apartments which have been constructed with modernized toilet facilities. Considering the various locations surveyed, commercial borehole situated in areas like Mushin, Agege, Alimosho and ifako-ijaiye has a lower level of sanitation to those situated in ikeja.

IV. CONCLUSION AND RECOMMENDATION

After carrying out this study, the following conclusions were drawn. All the respondents in the five local governments do not see sanitation and water as a priority but power supply. This is due to the following reasons:

i. They need power supply to pump water.

ii. They need power supply to carry out their daily work in make money

The study also revealed that the sanitation body picks up the waste generated regularly, but some people cannot afford to pay for the collection of their dirt. So they end up dropping it by the road side which overtime gets littered around. One of the challenges in the course of administering the questionnaires was that some residents were not showing interest in answering because they believe the government would not still do anything concerning their challenges. They said they had complained to the government a number of times but to no avail.

Therefore the following recommendations are made:

1. Therefore, it is expedient that the government should reduce cost of gaining access to potable water by maintaining and performing regular checks on damaged water facilities, and provide adequate power supply so as to allow the water corporations pump water for distribution to the public.

2. Drain covers should be provided so as to prevent blockage and breeding of mosquitoes in the environment.

3. Government as a driver of change should strengthen the State and Local Government councils so that they can fulfil their mandate in the water and sanitation sector if the nation as a whole is to meet the MDG target.

4. Adequate provision should be made for waste bins in the environment so as to allow people dispose their waste materials properly.

5. Introduction of seminars for sanitation: The government should conduct seminars from time to time to educate people on how to keep their environment clean in order to avoid the spread of diseases.

REFERENCES

[1]. O. Adewusi, (2012) An Evaluation of the interventionist Reforms by the Lagos State Government towards Achieving Millennium Development Goals (Mdgs) in Environmental Sanitation and Hygiene Practice. Available at www.ijhssnet.com/journal/index/1208

[2]. D. B. Bendahmane, (1993) Lessons Learned in Water, Sanitation and Health: Thirteen Years of Experience in Developing Countries. Arlington, Virginia: Water and Sanitation for Health (WASH) Project. Visited October 2013

[3]. T. Clasen, and A. Bastable, (2003) Faecal contamination of drinking water during collection and household storage: the need to extend protection to the point of use. J. Water Health 1(3), 109–115.

[4]. G. L. John, (2008) Water and Sanitation Monitoring Platform (WSMP), Nigeria. Visited October 2013.

[5]. A. L. Mabogunje, (2002) Land Management in Nigeria: Issues, Opportunities and Threats, Paper presented at the National Conference on Land Management and Taxation, Department of Estate Management, University of Lagos. Available from: worldbank.org/EXTARD/Resources/mabogunje.pdf. Accessed 3/01/2013.

[6]. D. A. Okun, (1988) The Value of Water Supply and Sanitation in Development: An Assessment: American Journal of Public Health, Vol. 78 (11), Pp. 1463-1467.

[7]. D. O. Olukanni, (2013) Assessment of WASH Program in Public Secondary Schools in South-Western Nigeria. ARPN Journal of Engineering and Applied Sciences Vol. 8 (3).

[8]. D. O. Olukanni, (2014a) The South-West Experience of Water, Sanitation and Hygiene (WaSH) Program in Educational Institutions in Nigeria: The Need for Policy Implementation. Proceeding of the International Conference on Technology, Education and Development (INTED 2014), Valencia, Spain, 10-12 March 2014.

[9]. D. O. Olukanni, R. A. Adebayo, and I. T. Tenebe, (2014c) Assessment of Urban Drainage and Sanitation Challenges in Nigeria. International Journal of Emerging Technology and Advanced Engineering. Vol. 4(12), Pp. 100-105.

[10]. H. Sari, and I. Ari, (2006). A guide to sanitation and hygiene for those working in developing countries. Visited October 2013.

[11]. UNESCO (2009). EFA Global Monitoring Report: Overcoming Inequality-Why Governance Matters. Paris.

[12]. WHO/UNICEF (2010). Joint monitoring report: Progress on Sanitation and Drinking Water http://www.who.int/water_sanitation_health/monitoring/fast_facts/en/index.html. Accessed 13th April, 2012.

[13]. UNICEF and WHO (2012). Progress on Drinking Water and Sanitation. Joint Monitoring Programme for Water Supply and Sanitation. http://data.worldbank.org/topic/agriculture-and-rural-development ISBN: 978-92-806-4632-0. Visited 15 February 2014.

[14]. WHO/UNICEF (2000) Global water supply and sanitation Assessment 2000 report. Available at: http://www.who.int/docstore/water_sanitation_health/Globassessment/GlobalTOC.htm Visited 23rd October 2013.

[15]. WSMP Nigeria, (2008) Water and Sanitation summary sheet. http:// www.unicef .org/nigeria/ng media water sanitation summary sheet.pdf. Visited 21 January 2014.

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Messrs. Michael O. Ajetomobi; Samson O. Tebowei; Olakunle O. Ologun; Oluwasanmi M. Kayode, are all graduates of Civil Engineering, Class of 2014, Covenant University. These students worked with the corresponding author in administering questionnaire and collection of data throughout the period of the study.